# Gulf Ecosystem Monitoring : A GEM Sampling Design for the Nearshore EVOSTC and NPS SWAN

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# GEM: An EVOS Legacy

4 Linked Habitats

- Offshore
- Alaska Coastal Current
- Nearshore
- Watersheds

# GEM Objectives

- To detect change
- To understand causes
- To predict future change
- To solve problems

# History of Nearshore GEM

- Oct 2001 - Start Planning process
  (Project 02395 - Schoch, Eckert, Dean)
- Nov 2001 - Workshop with academics
- Jan 2002 - Anchorage workshop with agency personnel, researchers, stakeholders
- Apr 2002 - Report providing conceptual design
- Oct 2002 - Developing GEM Designs
  (Project – 03687, Bodkin and Dean)
- Dec 2003 - Report with specific design alternatives/budgets
- Oct 2004 - Receive funding for implementation
- Nov. 2004 - Workshop to coordinate & collaborate

# General Design Characteristics

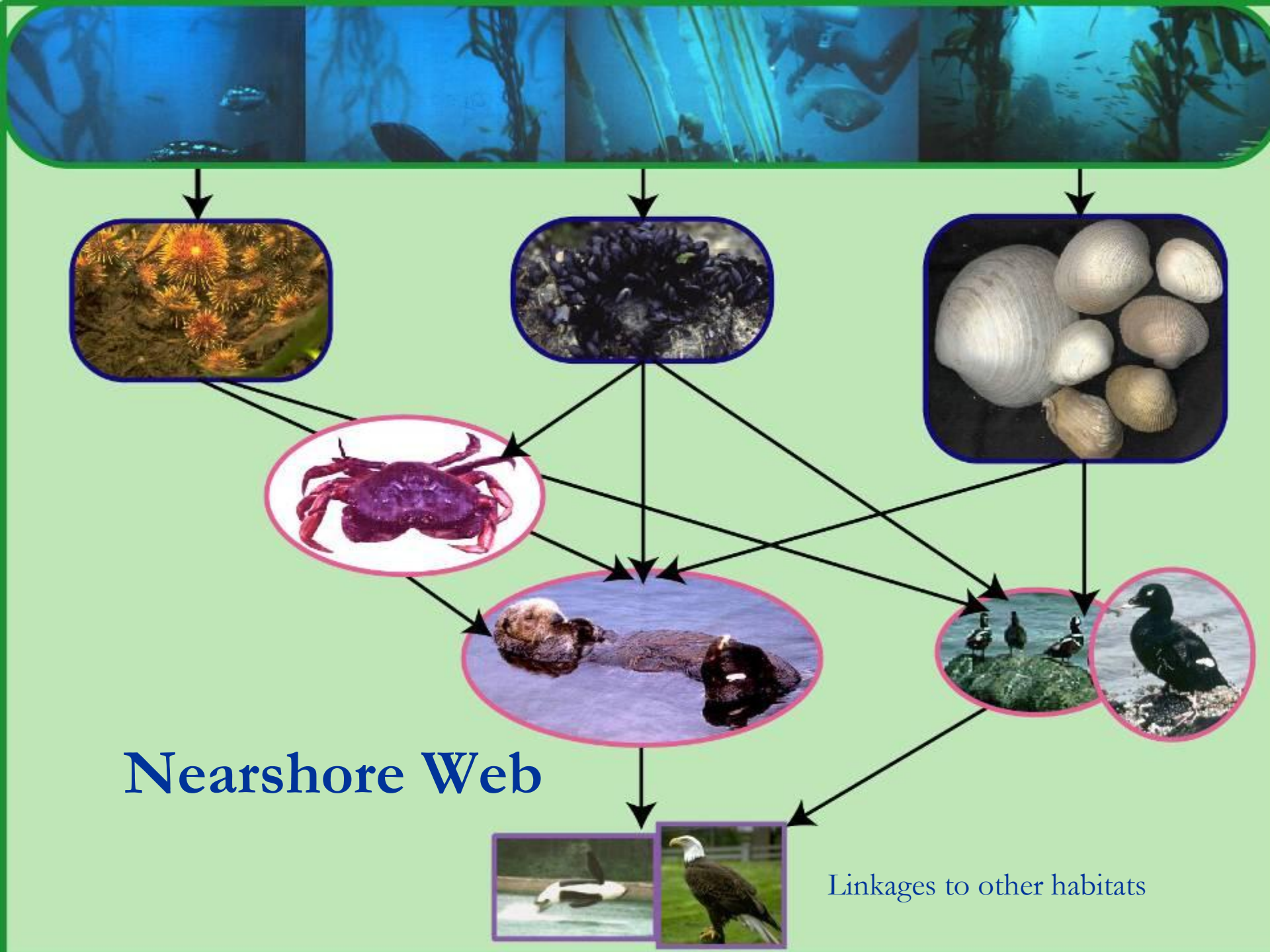
- Temporal scale – Yearly or greater
- Geographic scale – 1 km or greater
- Geographic constraint – Kodiak to Cordova
- Metrics – Selected vertebrates, algae, invertebrates, contaminants, physical factors
- Habitat constraint – Nearshore sheltered rocky and gravel / mixed sand gravel, intertidal focus, MLLW

# General Design Characteristics

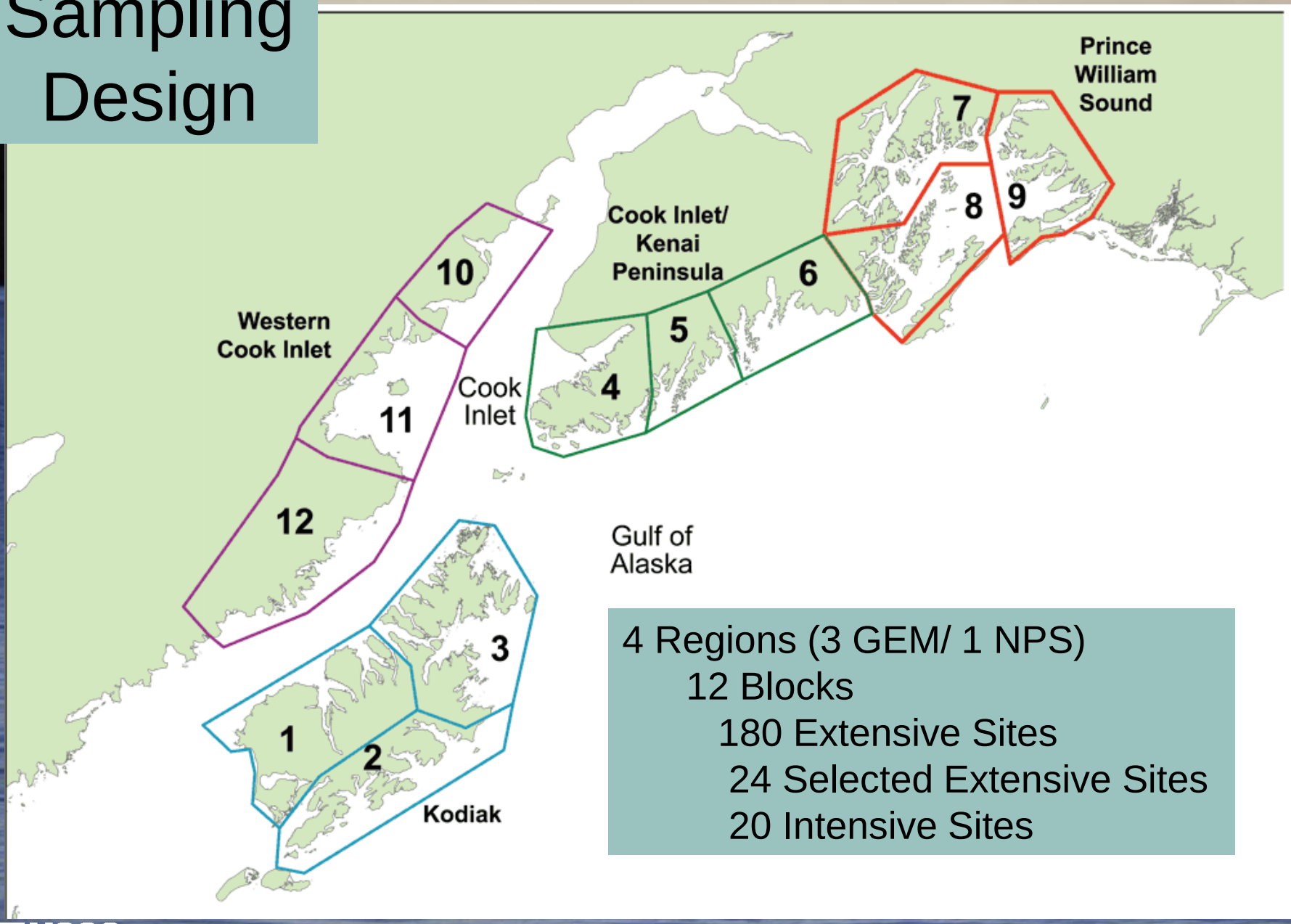
- Combination of synoptic, intensive, extensive sampling
- Systematic component to distribution of sampling effort
- Added selected extensive sites

# Defining the Nearshore

- High intertidal to ~ 20m depth
- Macro algae a primary contributor to productivity
- Food web based on sessile macro invertebrates
- Space is a limiting resource


Nearshore Web
Linkages to other habitats

# Sampling Design




4 Regions (3 GEM/ 1 NPS)
12 Blocks
180 Extensive Sites
24 Selected Extensive Sites
20 Intensive Sites

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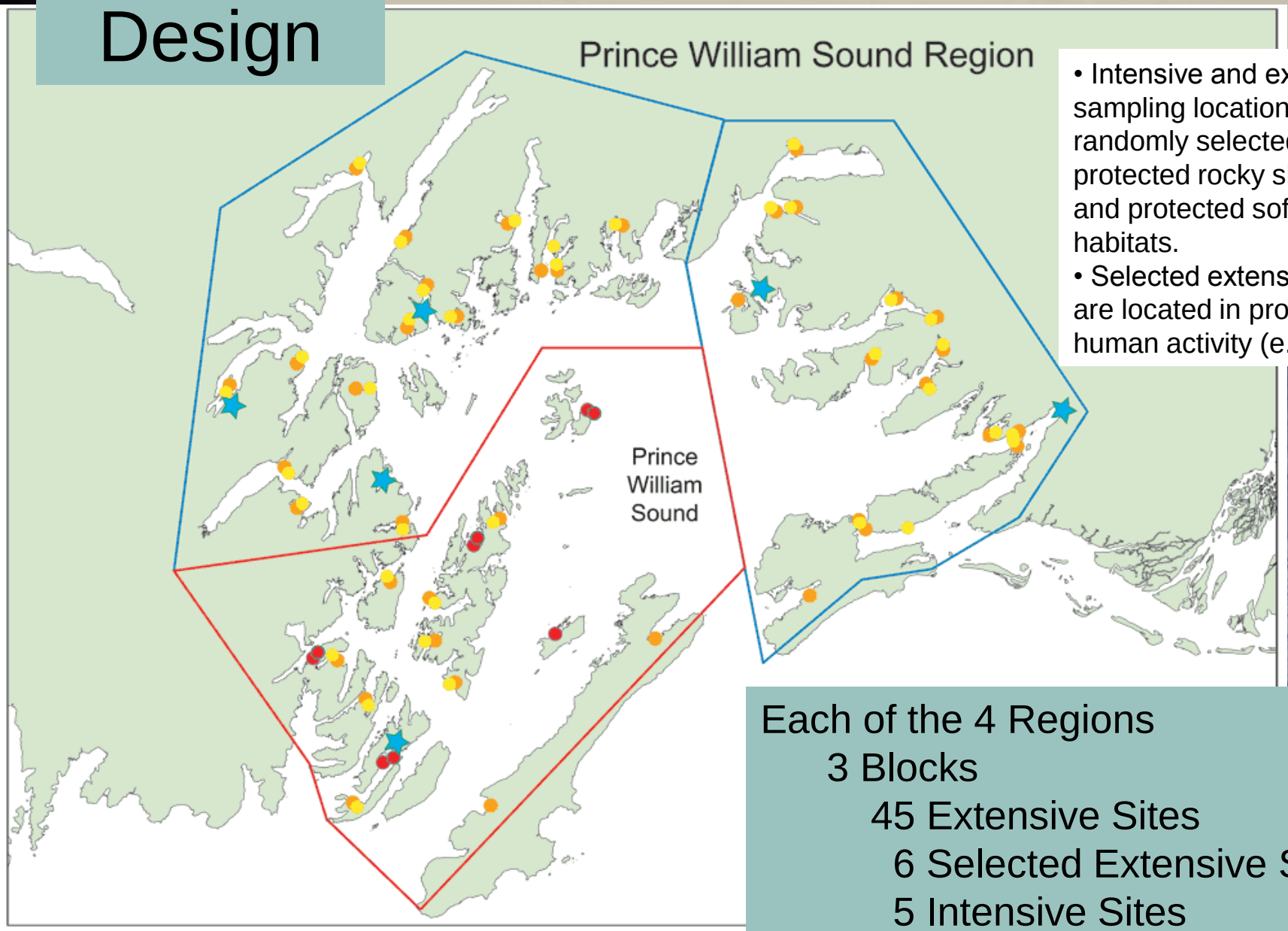
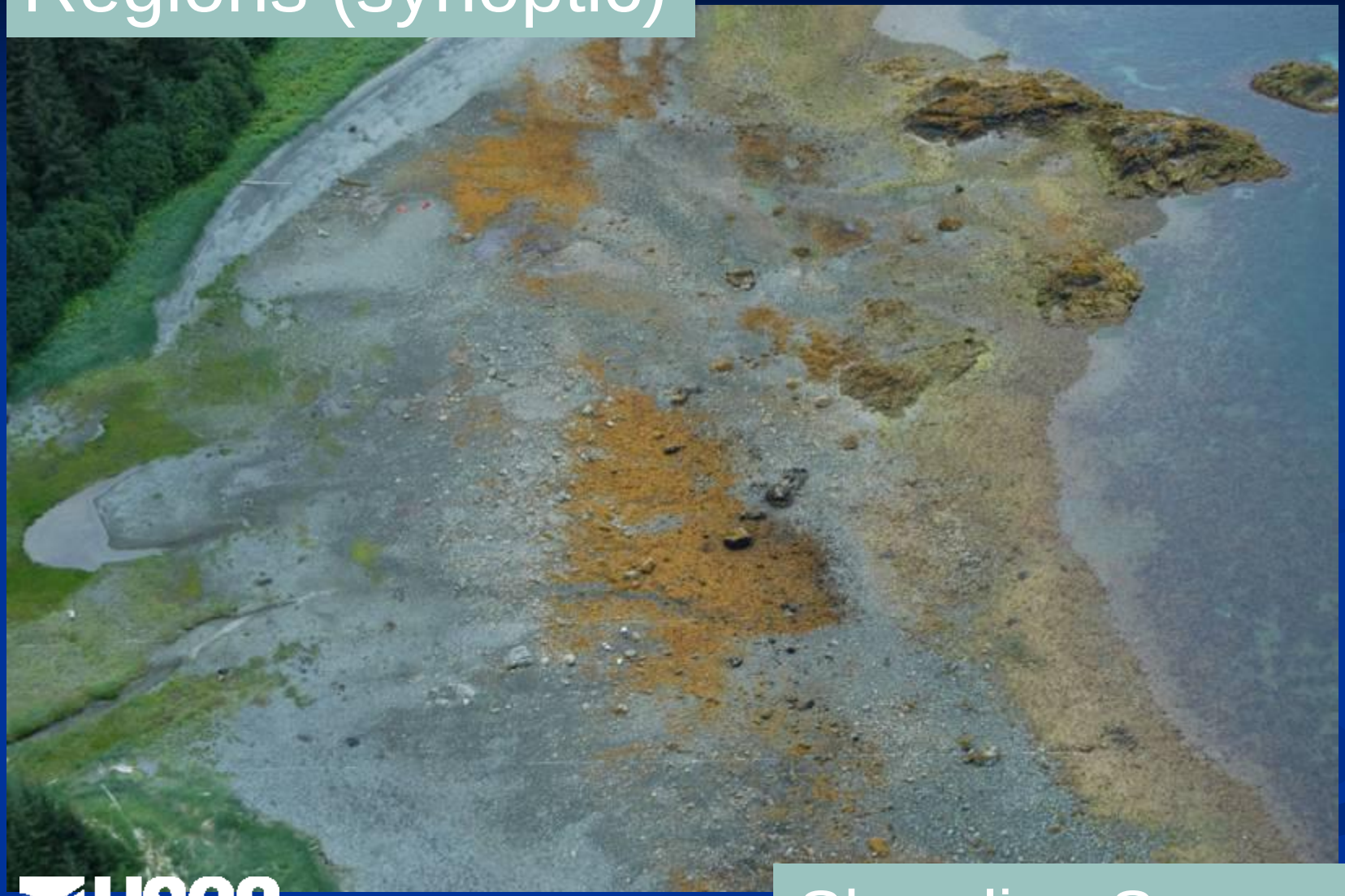
# Sampling Design




- Intensive and extensive sampling locations are randomly selected from protected rocky shoreline and protected soft-sediment habitats.
- Selected extensive sites are located in proximity to human activity (e.g. harbors)

Each of the 4 Regions
- 3 Blocks
  - 45 Extensive Sites
    - 6 Selected Extensive Sites
    - 5 Intensive Sites

# Regions (synoptic)



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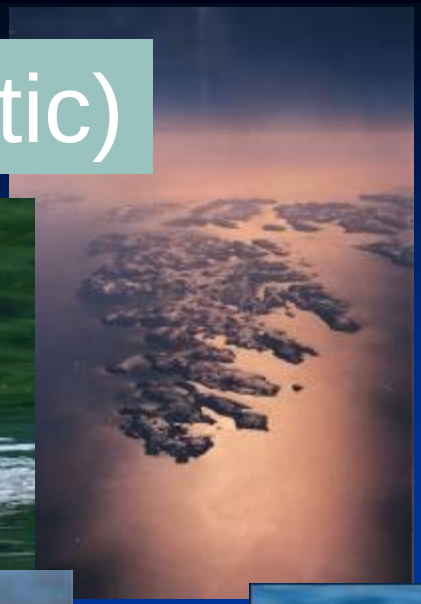
Shoreline Surveys

# Blocks (synoptic)



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Nearshore Birds and Marine Mammals
- Abundance
- Diet
- Productivity

# Sites - Intensive

## Physical Measures

## Intertidal/Subtidal Communities

- Density
- Productivity
- Diversity

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# Sites - Extensive

- Abundance
- Sizes

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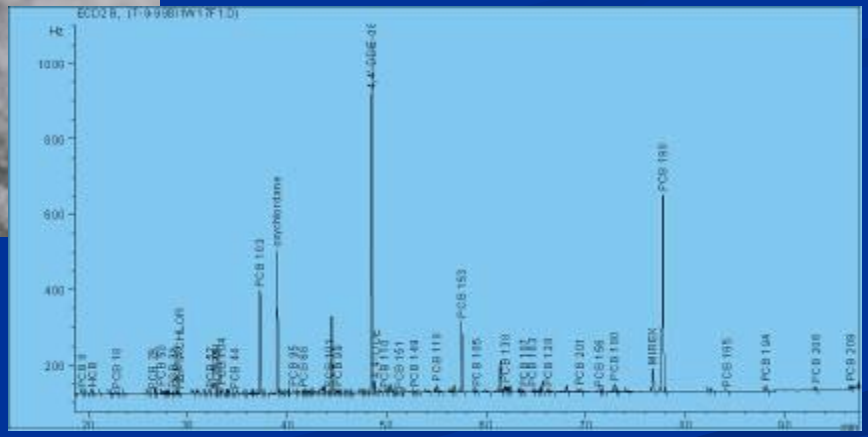
# Subsistence Food



- Contaminants

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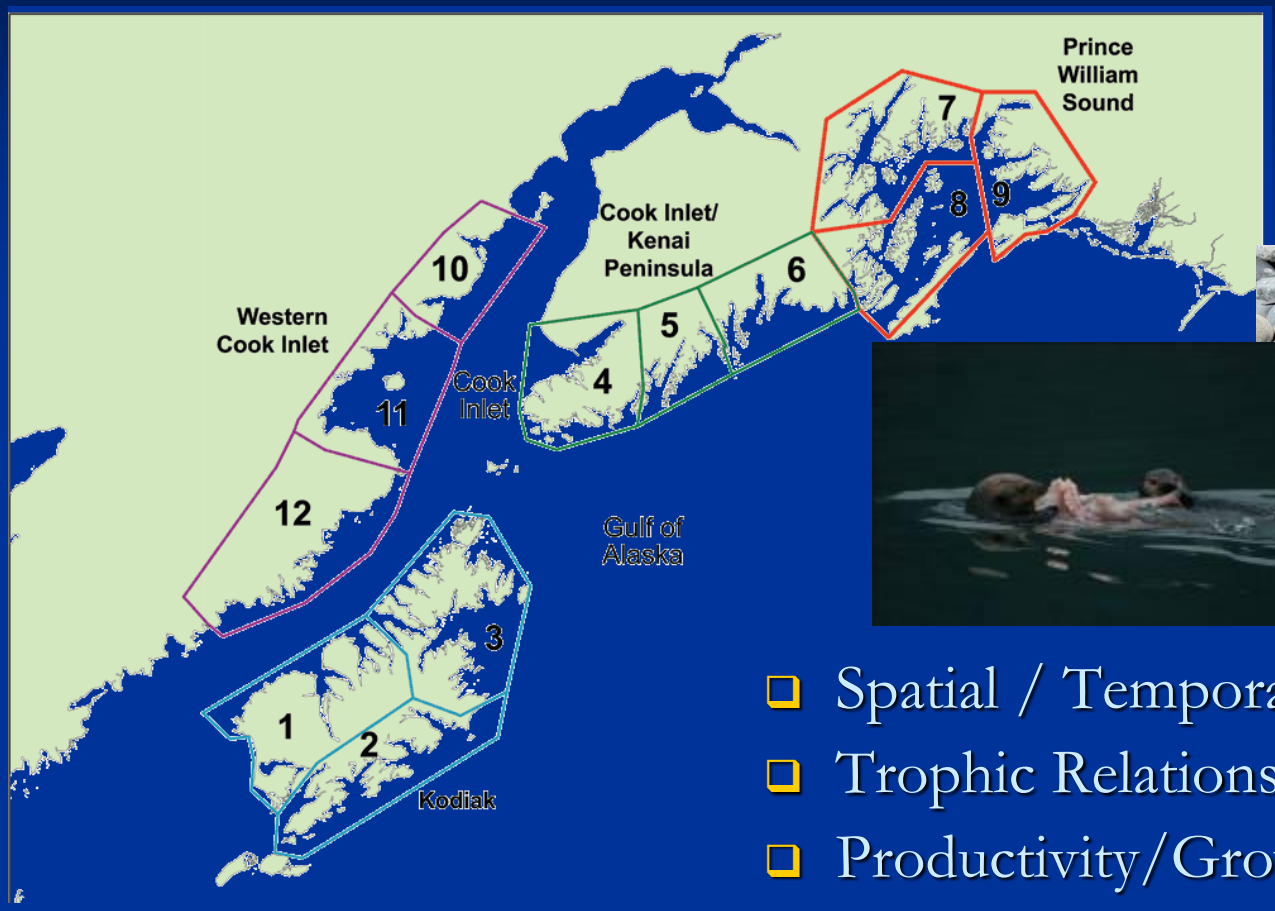
# Understanding Causes for Change






- Spatial / Temporal Patterns of Change
- Trophic Relations
- Productivity/Growth
- Survival/Size and Age structures
- Research Fund